

Chest Trauma Management

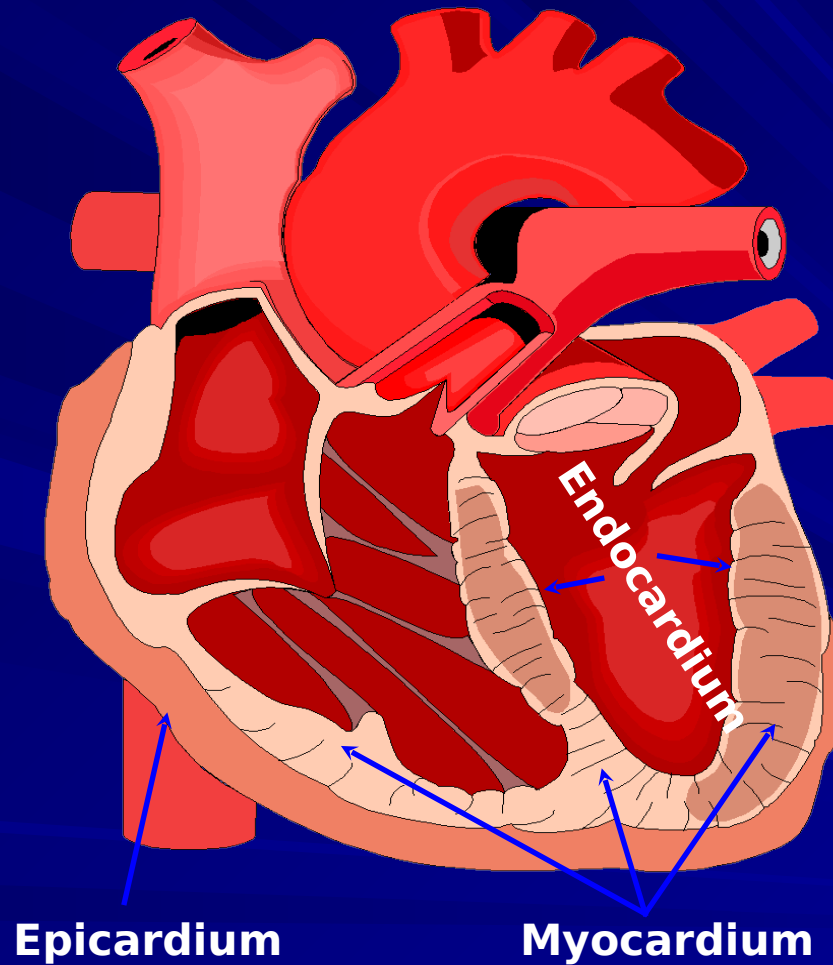


General

- Chest injuries may result from:
 - Gunshot wounds (GSW)
 - Shrapnel
 - Explosions
 - Motor vehicle crashes (MVC)
 - Falls
 - Crush injuries
 - Stab wounds

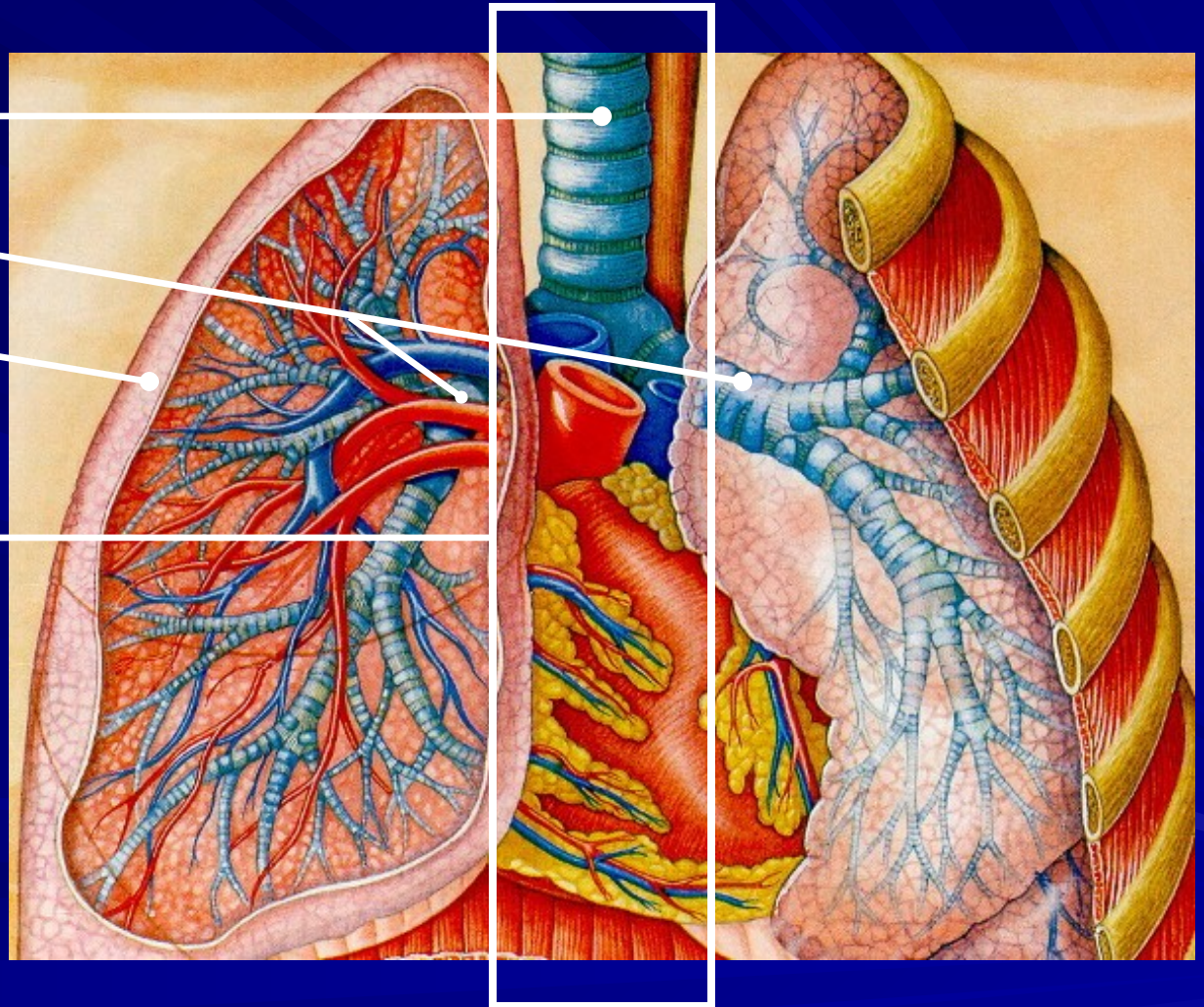
Organs of the Thorax

- Heart

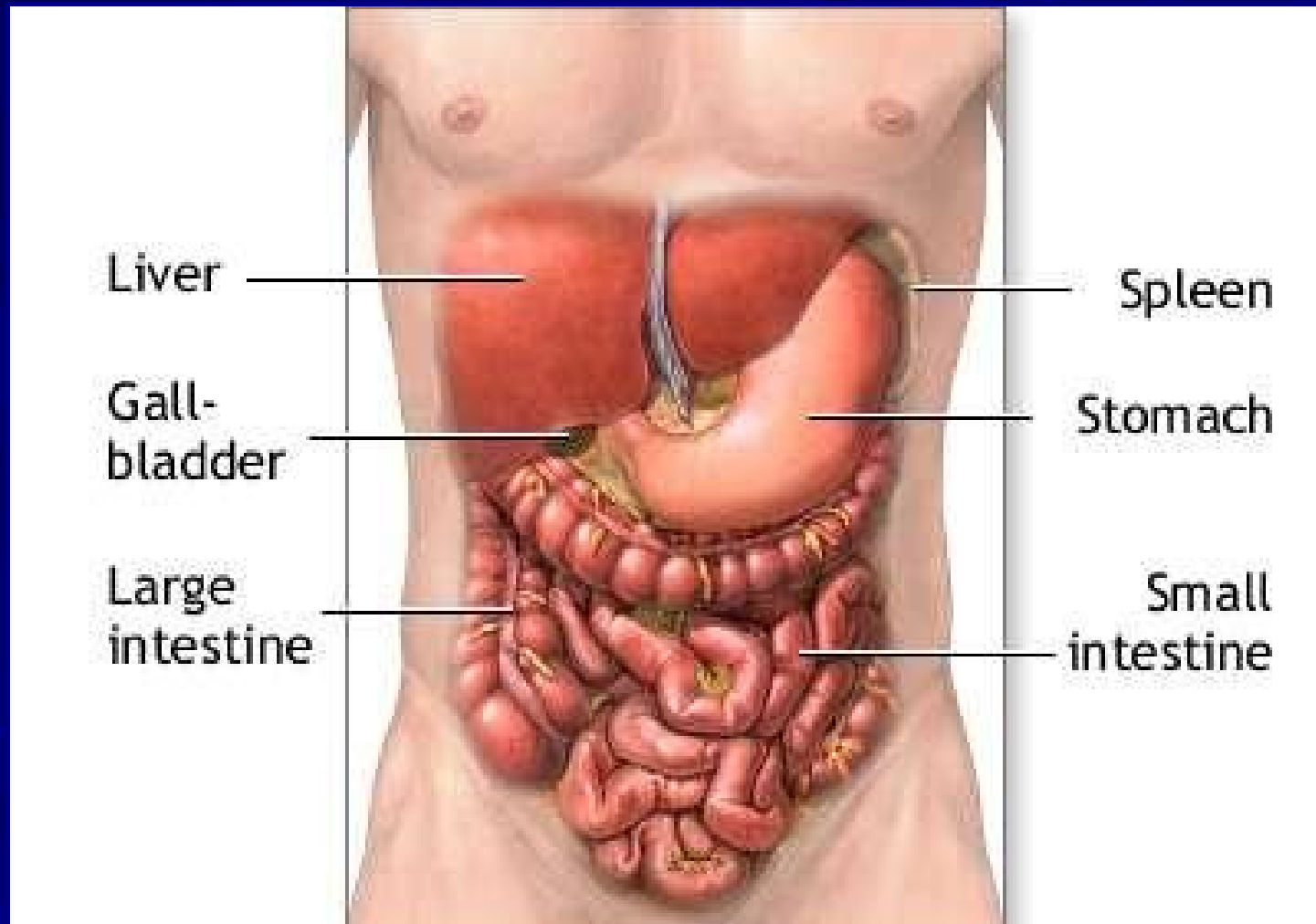


Organs of the Thorax

- Trachea
- Bronchi
- Lungs
- Mediastinum



Organs of the Abdomen



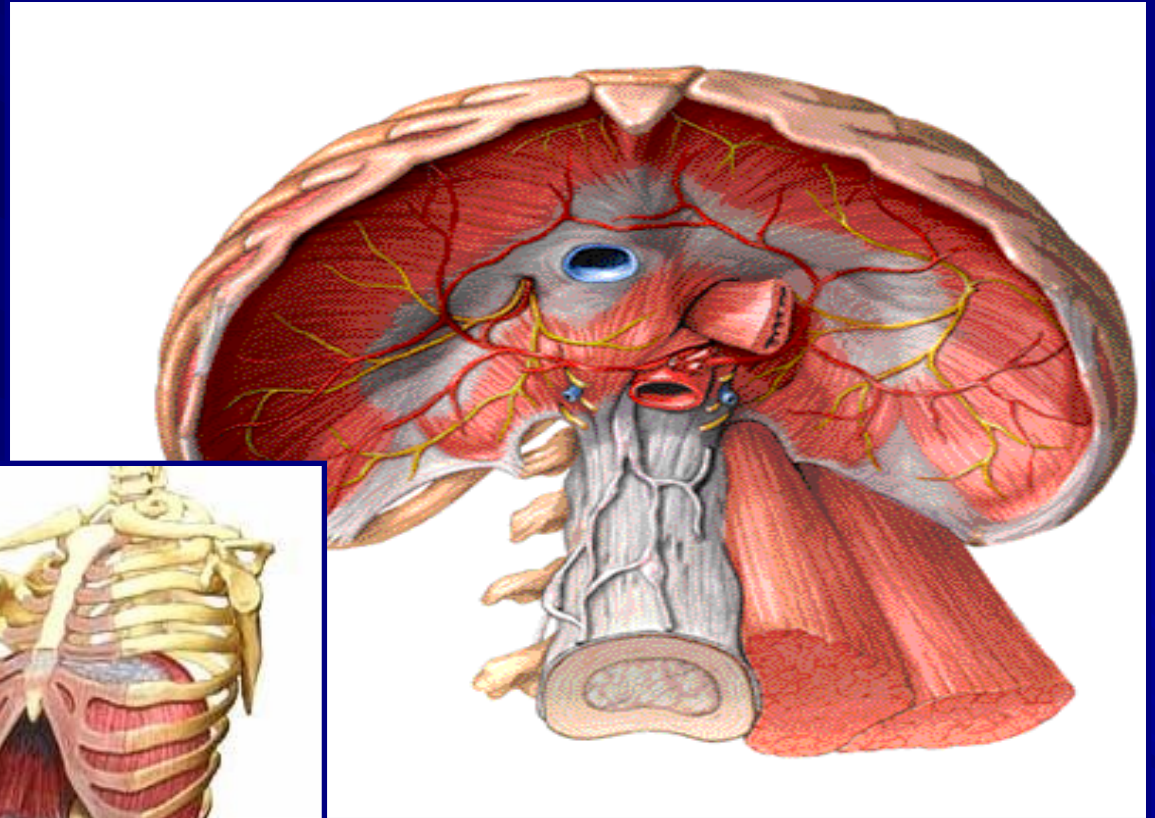
Organs of the Abdomen

- Muscles



Organs of the Abdomen

- Diaphragm



Determine the MOI

- Penetrating trauma.
 - GSW or stab wounds
 - Concentrates forces over smaller area
 - Bullet trajectories unpredictable
- Blunt trauma.
 - Force distributed over larger area
 - Visceral injuries occur from:
 - Deceleration
 - Compression
 - Sheering forces
 - Bursting

Assess the Casualty

- Identify signs and symptoms:
 - Assess mental status (AVPU)
 - Assess the airway
 - Assess the breathing
 - Assess the circulation

Signs Indicative of Chest Injury

- Shock.
- Cyanosis.
- Hemoptysis.
- Chest wall contusion.
- Flail chest.
- Open wounds.
- Jugular vein distention (JVD).
- Tracheal deviation.

Assess Respirations

- Respiratory rate and effort:
 - Tachypnea
 - Bradypnea
 - Labored
 - Retractions
 - Progressive respiratory distress

Assess the Neck

- Position of trachea.
- Subcutaneous emphysema.
- JVD.



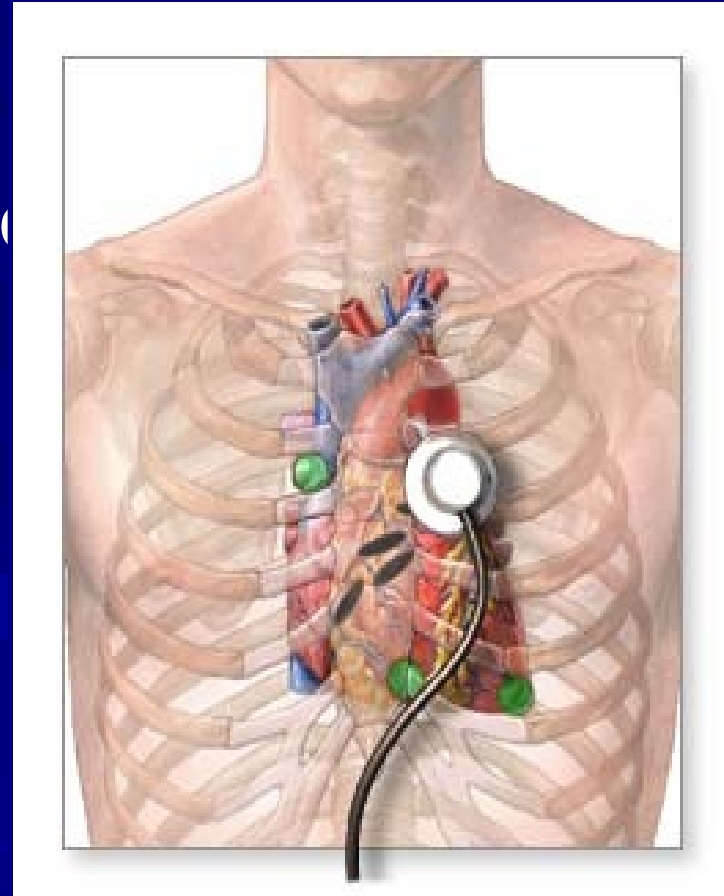
Assess the Chest Wall

- Contusions.
- Tenderness.
- Asymmetry.
- Open wounds or impaled objects.
- Crepitation.
- Paradoxical movement



Assess the Chest Wall

- Lung sounds:
 - Absent or decreased
 - Unilateral
 - Bilateral
 - Location
 - Bowel sounds in chest?



Assess the Chest Wall

- Lung sounds – Percussion.
 - Hyperresonance
 - Pneumothorax
 - Tension pneumothorax
 - Hyporesonance (hemothorax)

Assess the Chest Wall



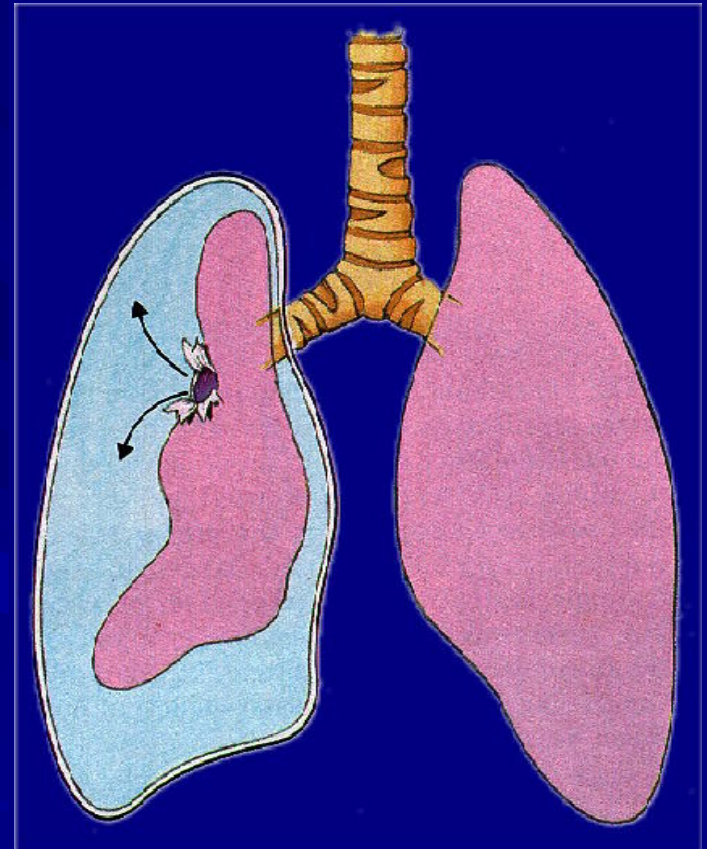
- Compare both sides of the chest at the same time when assessing for asymmetry.

Chest Physiology

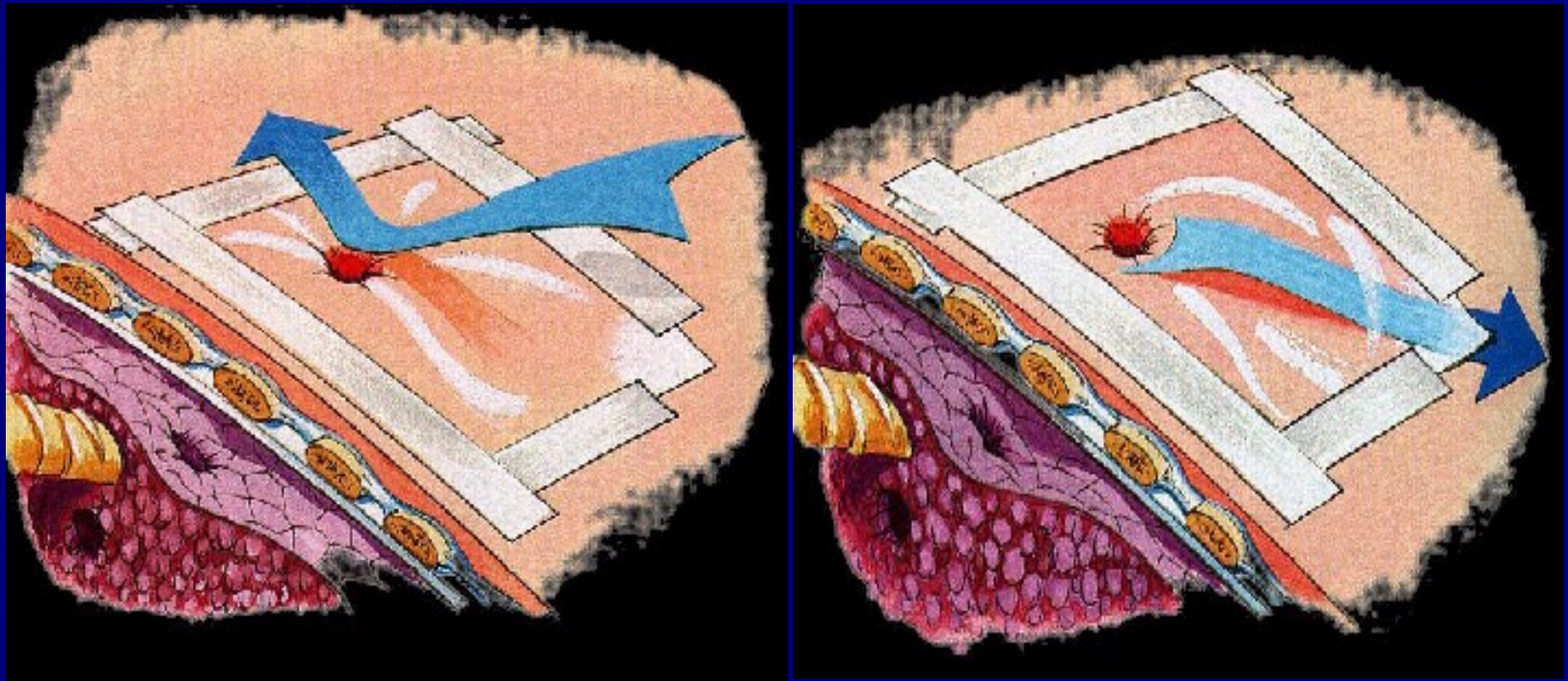
- Chest normally has negative pressure.
- Penetrating wound creates a positive pressure in chest cavity.
- Air will enter the easiest route. If a hole in the chest is smaller than $\frac{2}{3}$ the size of the trachea, air will enter through the trachea preferentially and not through the hole in the chest.

Open Pneumothorax

- Caused by penetrating thoracic injury.
- May present as a “sucking chest wound” if $> 2/3$ diameter of the trachea.



Open Pneumothorax

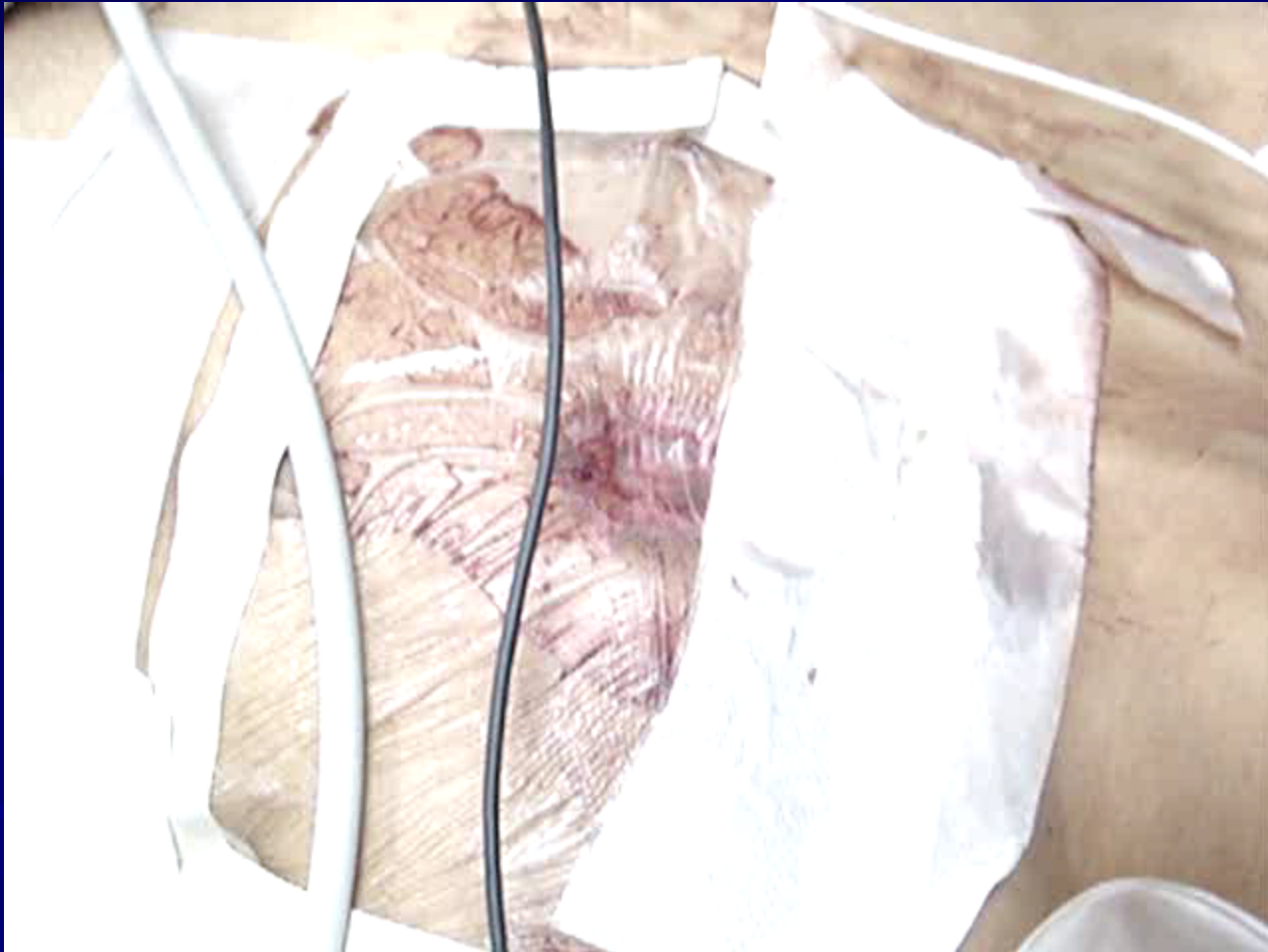


Open Pneumothorax



Click on picture for video
CMAST

Open Pneumothorax



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Open Pneumothorax

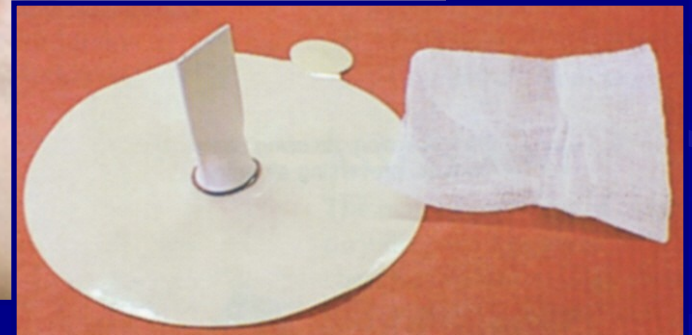
- Management:
 - Ensure an open airway
 - Close the chest wall defect, both entrance and exit with an occlusive dressing, petrolatum gauze or Asherman Chest Seal®
 - Place the casualty in the sitting position
 - Monitor respirations after an occlusive dressing is applied

Open Pneumothorax

- Petroleum Gauze can also be used to seal a sucking chest wound.



"Asherman Chest Seal®"

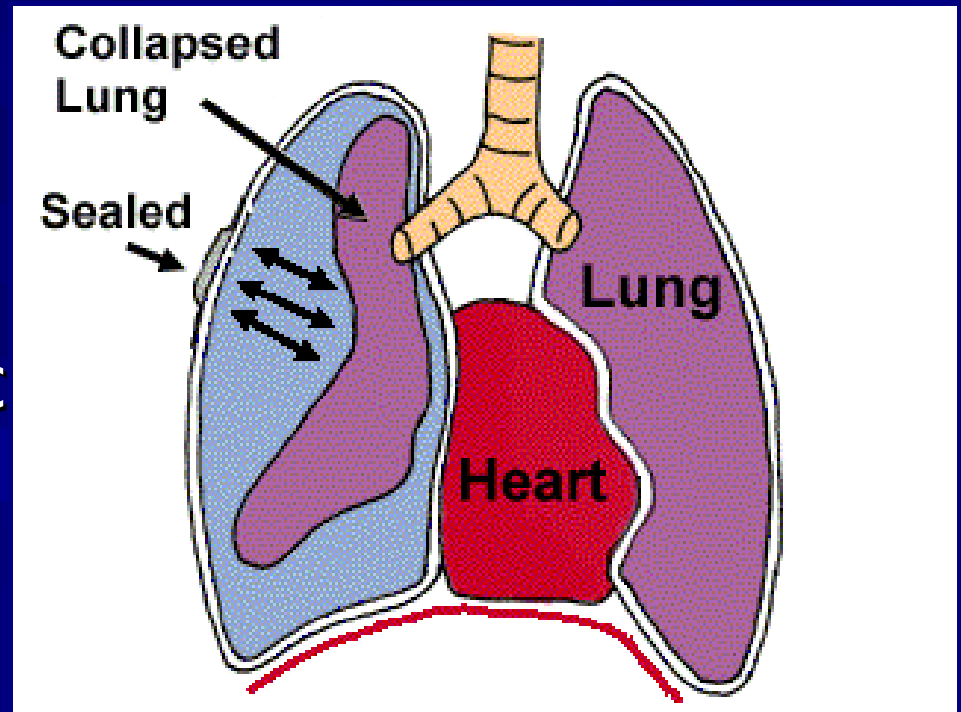


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Tension Pneumothorax

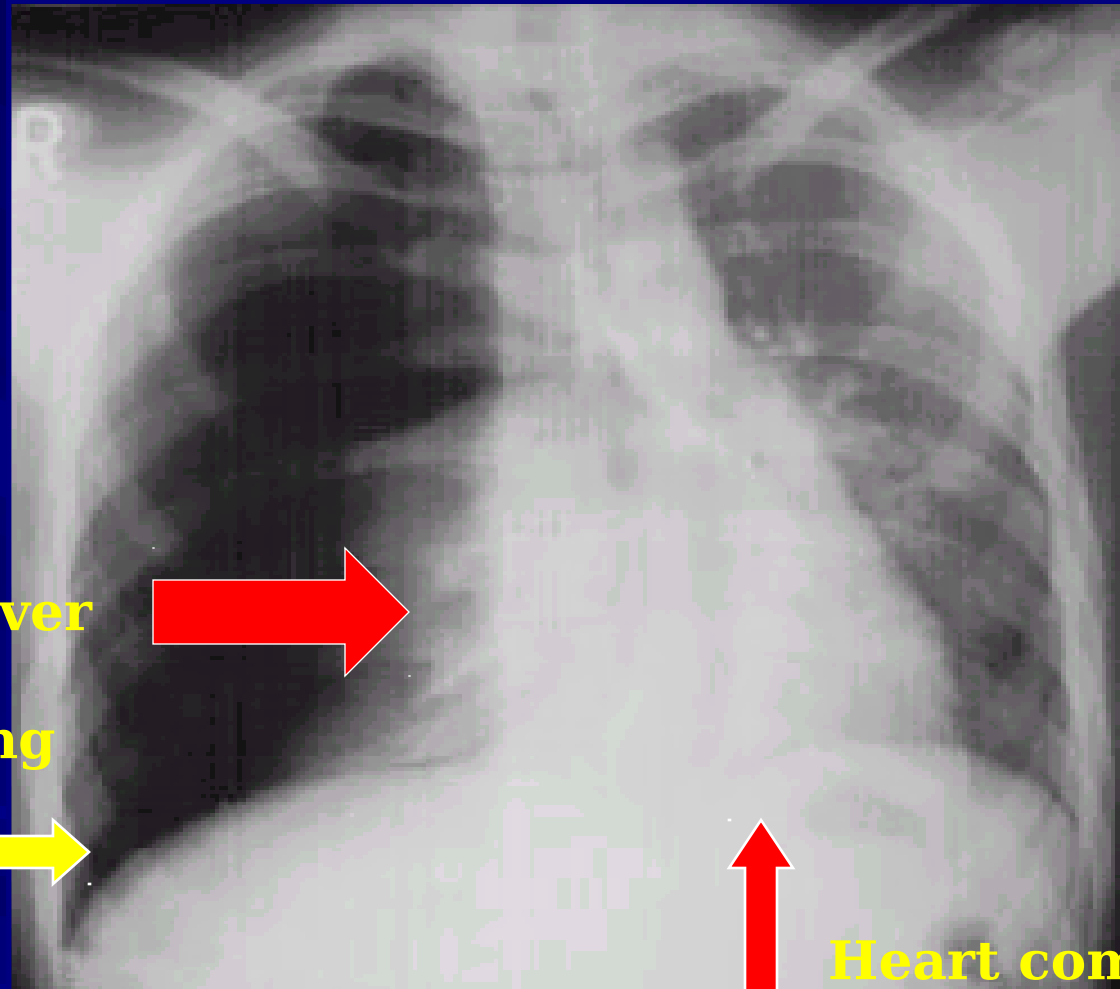
- One-way valve created from penetrating trauma.
- Air enters thoracic space but cannot escape.
- Pressure builds:



Tension Pneumothorax

- If after sealing the open pneumothorax, the casualty develops progressive difficulty breathing, consider this a tension pneumothorax and perform a needle chest decompression.
- If no capability of NCD exists and the casualty continues to have progressive respiratory distress, remove the occlusive dressing and stick a gloved finger into the open wound and attempt to “burp” the wound.

Tension Pneumothorax



**Air pushes over
heart and
collapses lung**

**Air
outside
lung
from
wound**

**Heart compressed
not able to pump
well**

CMAS^T

Tension Pneumothorax

- Clinical presentation:
 - Anxiety, agitation, apprehension
 - Diminished or absent breath sounds
 - Increasing dyspnea with cyanosis
 - Tachypnea
 - Hyperresonance to percussion on affected side
 - Hypotension, cold clammy skin
 - Casualty begins to deteriorate rapidly

Tension Pneumothorax

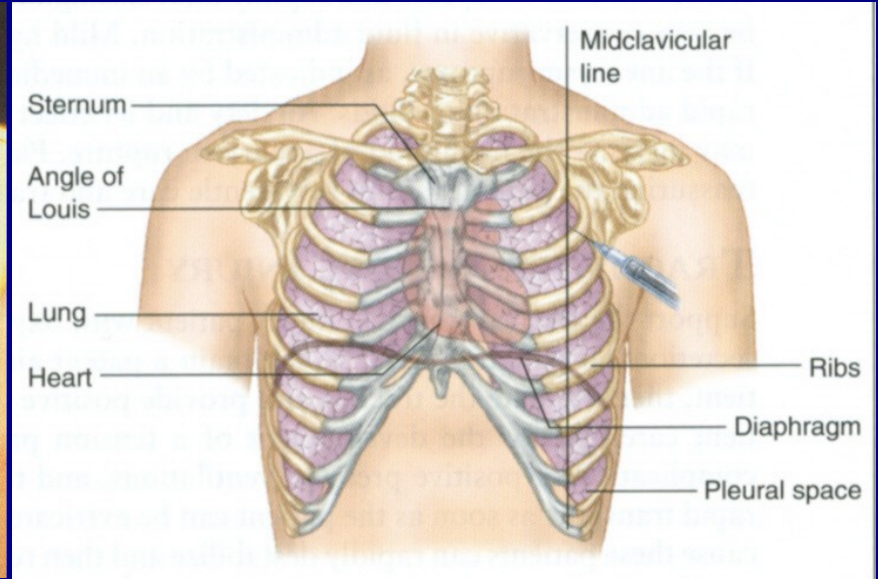
- Clinical presentation (cont'd):
 - JVD and cyanosis
 - Decreased lung compliance (intubated)
 - Tracheal deviation (*late*)
- * These signs are hard to detect in a combat environment.

Tension Pneumothorax

- Management:
 - Ensure an open airway
 - Decompress the affected side
- Indications:
 - Penetrating chest wound with progressive respiratory distress

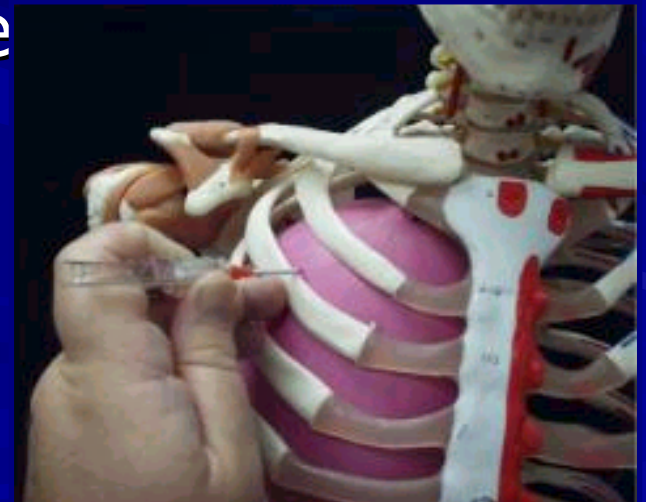
Needle Chest Decompression

- Procedure:
 - Identify the second ICS on the anterior chest wall, MCL:



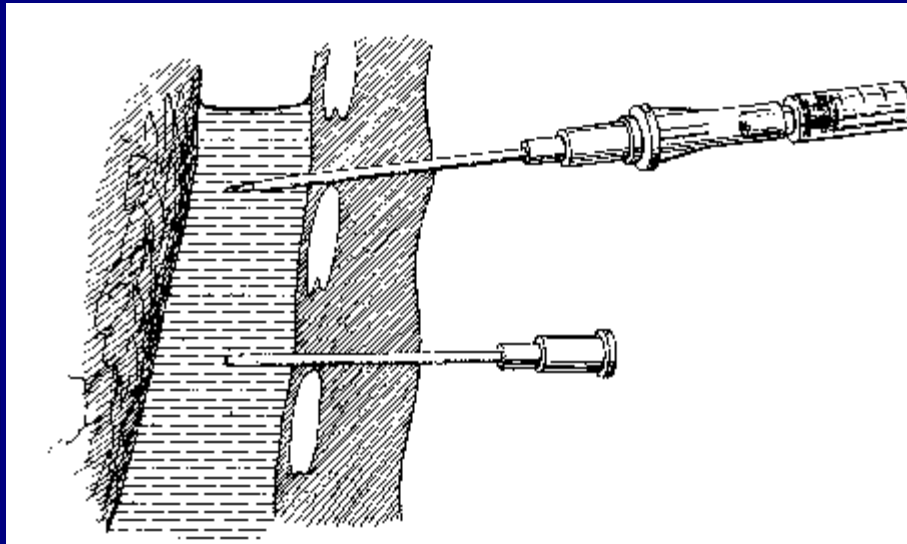
Needle Chest Decompression

- Prep the area with an antimicrobial agent.
- Insert a 14 ga. Catheter at a 90° angle over the the 3rd rib, into the pleural space at the
- Needle should be long enough to enter the chest cavity (2½ – 3 inches)



Needle Chest Decompression

- If a tension pneumothorax is present, a “hiss of air” may be heard escaping from the chest cavity.
- Remove the needle, leave the catheter in place.



Needle Chest Decompression

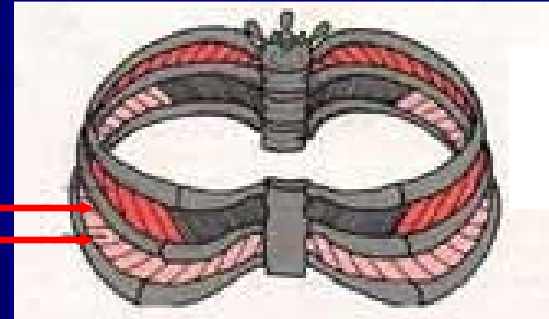
- Tape the catheter hub to the chest wall.
- The casualty's condition should rapidly improve.
- Evacuate ASAP.



Needle Chest Decompression

- Questions:

- Over top or bottom of rib? Why?



- What if casualty doesn't have a tension pneumothorax and you perform NCD?
 - Already has hole(s) in chest
 - Probably larger than diameter of 14 ga. needle
 - No additional damage

Needle Chest Decompression

- Questions:
 - Will lung re-inflate after pressure is released from chest cavity?
 - No; to re-inflate the lung you must have a chest tube with suction and or positive pressure ventilation.

Needle Chest Decompression

- Questions:
 - So if the NCD does not re-inflate the lung what does it do?
 - We are simply converting a tension pneumothorax to a standard pneumothorax; this is much more survivable than a tension pneumothorax.

Needle Chest Decompression

- Complications:
 - Insertion of the needle over the top of the rib prevents laceration of the intercostal vessels or nerve which can cause hemorrhage or nerve damage.

Summary

- Injuries to the chest are fewer in nature secondary to modern body armor; however, it doesn't protect 100%.
- Penetrating wounds to the chest can be rapidly fatal if not identified early and treated appropriately.

Questions?

